Landing site selection for the MELOS lander: Preliminary planning started

Hideaki Miyamoto[1]; Goro Komatsu[2]; Nobuo Geshi[3]; Hirohide Demura[4]; Sho Sasaki[5]; Soichi Omori[6]; Kei Kurita[7]; Ayako Suzuki[7]; Yayoi N. Miura[8]; Shogo Tachibana[9]; Tatsuaki Okada[10]; Seiji Sugita[11]; Takehiko Satoh[10]; Naru Hirata[4]; Yoshiko Ogawa[12]; Chikatoshi Honda[13]; Kohei Kitazato[14]; Masanao Abe[10]; Makiko Ohtake[10]; Tomoko Arai[15]; Kazuto Saiki[16]; Hideaki Miyamoto Discussion Group for the Lander of MELOS Mars Exploration Mission[17]

[1] The University Museum, Univ. Tokyo; [2] IRSPS; [3] GSJ, AIST; [4] Univ. of Aizu; [5] RISE, NAOJ; [6] Res. Centr. Evolving Earth and Planets, Tokyo Tech.; [7] ERI,Univ. of Tokyo; [8] ERI, Univ. of Tokyo; [9] Earth and Planet. Sci., Univ. of Tokyo; [10] ISAS/JAXA; [11] Dept. of Complexity Sci. & Eng., Univ. of Tokyo; [12] NIES; [13] JAXA; [14] Kobe Univ.; [15] Univ. of Tokyo; [16] Earth and Space Sci., Osaka Univ.; [17] -

http://www.um.u-tokyo.ac.jp/hp/miyamoto/index.html

A Japanese Mars Exploration with a Lander and Orbiters (MELOS) is now actively discussed in Japanese planetary science community. In this presentation, we summarize the current status of the preliminary planning of the lander-part of the mission, including the landing site candidates.

The science team of the MELOS lander now pursues the optimal mission concept, which maximizes scientific merits within the limited resources we can spare for the lander. Scientific synergy with two orbiters in the frame of the MELOS mission is always considered important. Various possibilities are currently discussed, and many remain undetermined including even the number of landers. A wide range of potential science objectives are proposed. Those include exploring deep and shallow internal structures of Mars, finding current seismic and thermal activities, understanding current and ancient climate changes, and filling the gap regarding subsurface and internal processes. The team realizes that the choice of landing site would play a critical role in determining which of these objectives should be selected for the major science target of the mission.

Landing site candidates proposed so far include young volcanic features, putative equatorial glaciers, polar deposits, layered deposits, fresh craters, bottoms of deep canyons, central region of northern plane, and ancient large craters. These areas should have experienced a variety of significant processes, such as igneous, sedimentary, hydrothermal, aqueous alteration, dust transfer, periglacial alteriation, that played key roles in the formation of the martian crust and atmosphere. Describing and characterizing the geology of the landing region will have the highest priority of the lander science as well as geophysical investigations such as seismic and heat-flow measurements at a single or multiple point. Instruments for the chemical, isotopic, and mineralogical composition of martian surface at all appropriate spatial scales are considered in terms of their scientific merits and engineering feasibilities. Selections of the onboard instruments and the landing site would be carefully made after further discussions in the science and engineering communities.